Use of ultrasound derived carotid intima-media thickness and plaque volume to predict single or multivessel coronary artery disease

34. Use of ultrasound derived carotid intima-media thickness and plaque volume to predict single or multivessel coronary artery disease

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Background: Increased carotid intima-media thickness (cIMT) has been extensively evaluated as a marker of cardiovascular (CV) risk. However, there is only limited evidence correlating cIMT measurements with anatomical severity of vascular disease. This study compared the value cIMT +/- other carotid measurements to predict the presence and severity of significant coronary artery disease (CAD).

Methods: Patients were included with a history of ischaemic-type chest pain or angina equivalent and undergoing either Invasive Coronary Angiogram (ICA) or Computed Tomography Coronary Angiography (CTCA). All patients underwent high-resolution B-mode ultrasound imaging to measure cIMT and B-Mode 3D-imaging to measure Total Plaque Volume (TPV) and Maximum Area Reduction (MAR) using latest generation dedicated hardware and software. cIMT normal ranges were defined by previous independent population studies. An operator, blinded to carotid measurements, defined the presence and severity CAD on ICA or CTCA. The study was supported by a European Union INTERREG VA Programme grant.

Results: The study population comprised of 90 subjects (73% male). Mean age was 66.2±11.63SD years (range, 42-88 years). CV risks factors included family history of CAD (74%), current or ex-smoker (69%), hypertension (66%), a history of hyperlipidaemia (61%) and diabetes (21%). On ICA or CTCA, 62% of patients had severe disease (defined as at least 70% area stenosis or pressure wire positive) in at least one coronary artery, and 39% had severe multivessel disease (in 2 or more vessels). The presence of elevated cIMT ≥50th percentile predicted the likelihood of severe multivessel CAD (relative risk [RR] 1.49; 47% vs 21%; p=0.022) and the likelihood of severe CAD in at least one vessel (RR 1.65; 71% vs 43%; p=0.011). Use of cIMT ≥75th percentile cut off did not increase predictive value. On 3D analysis, TPV in the top tertile predicted likelihood of severe CAD in at least one vessel (RR 1.4; 77% vs 55%; p=0.046). MAR did not add further to the predictive value. (Table 1)

Conclusions: In a population of patients with ischaemic type chest pain or angina equivalent symptoms, elevated cIMT (≥50th percentile) predicted an increased risk of severe CAD in at least one vessel and over double the risk of severe multivessel CAD. CIMT may thus be a useful tool to help triage patients most likely to benefit from invasive coronary investigation.

Abstract 34, Table 1: Results

	cIMT ≥50th percentile (n=62)	cIMT <50th percentile (n=28)	p value	cIMT ≥75th percentile (n=41)	cIMT <75th percentile (n=49)	p value
Severe CAD in at least one vessel	44	12	0.011	31	25	0.016
Severe multivessel CAD	29	6	0.022	19	16	0.18